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ABSTRACT

Student market segmentation separates prospective college students into subgroups with similar characteristics, the most commonly used being geography, demography, attitudes, and behavior. Recruitment efforts can then focus on student segments similar to the present student body or on other students that might be attracted. The goal is to make potential students aware of institutional opportunities and to match their aspirations with the institutional environment. Data bases available for student segmentation are the ACE/CIRP Freshman Survey, the SAT scores reported by students to designated schools, and the SAT Student Search Service. The advantage of the Freshman Survey and the SAT score report data is the level of detailed student information provided to the institution. The advantage of the SAT Student Search Service is accessibility to the entire test-taking population. Only names and addresses, however, are provided by the service and the segmentation information is not released. Three statistical techniques can develop student segments. Factor analysis reduces large numbers of interrelated student variables to a smaller number of independent variables; criterion grouping or cluster analysis creates segments; and discriminant analysis describes the characteristics that are the primary sources of difference between the segments. (Author)

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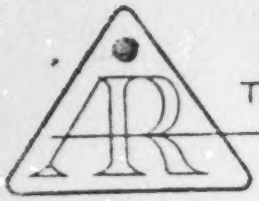

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The Uses of Student Market Segmentation Techniques in College Recruitment

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Abstract

Student market segmentation separates prospective college students into subgroups with similar characteristics, the most commonly used being geography, demography, attitudes, and behavior. Recruitment efforts can then focus on student segments similar to the present student body or on other students that might be attracted. The goal is to make potential students aware of institutional opportunities and to match their aspirations with the institutional environment.

Data bases available for student segmentation are the ACE/CIRP Freshman Survey, the SAT scores reported by students to designated schools, and the SAT Student Search Service. The advantage of the Freshman Survey and the SAT score report data is the level of detailed student information provided to the institution. The advantage of the SAT Student Search Service is accessibility to the entire test-taking population. Only names and addresses, however, are provided by the service and the segmentation information is not released.

Three statistical techniques can develop student segments. Factor analysis reduces large numbers of interrelated student variables to a smaller number of independent variables; criterion grouping or cluster analysis creates segments; and discriminant analysis describes the characteristics that are the primary sources of difference between the segments.

Introduction

This paper explains student market segmentation, why it is important in recruitment activities, what types of data may be analyzed, and how student segments are developed.

Segmentation differentiates members of the potential student population into subgroups using individual characteristics such as geography, demography, attitudes and behavior. The result is that students are no longer visualized as an undifferentiated mass, but rather as members of distinct subgroups with specific descriptions.

Segmentation is important because resources need not be expended in a shotgun approach to reach all students with a general message. Instead, recruitment efforts use student segment profiles to focus on students who seem well matched to the institution and who might choose to attend. A more efficient application of resources and an increase in the number of student/institution matches results.

Segmentation information about the potential student population comes from many sources. Educational, commercial, and institutional data bases provide most of the information necessary to segment the student market. Survey research on small student samples provides additional segmentation information not otherwise available. The decision on the appropriate data base to analyze is based on the types of variables included, the timing of data availability, the sample of the high school graduate population, and the costs of access. When all the required segmentation data are not available from one source, these data bases can be combined to provide more complete information.

Once the data are collected, there are three stages in a typical student segment analysis. The principal components method of factor analysis reduces the original interrelated variables to a smaller set of independent variables. Cluster analysis creates student segments by grouping students with similar characteristics. Discriminant analysis determines the primary sources of differences between segments.

Principles of Segmentation

Definition of Market Segmentation

According to Kotler (1975, p. 99), market segmentation ". . . consists of dividing the market into fairly homogeneous parts where any part may conceivably be selected as a market target to be reached with a distinct marketing mix." Its objectives (Boyd and Massy, 1972, p. 87) ". . . is to group individual prospects so that their responses to marketing inputs will be similar; that is, the sensitivities to these inputs should vary greatly among segments, but little within segments." In terms of the potential student market for higher education, the goal of segmentation is to discover student groups using variables that can provide insight into the college decision process. There are limitless combinations of variables for student market segmentation, but the selection is based on some conception of the important differences that exist among the student market members, and how they affect the college decision.

Marketers in higher education often see high school achievement and performance on the Scholastic Aptitude Test (SAT) as variables useful in grouping similar levels of student ability and in differentiating between prospective student groups. They choose one or more ability segments and aim recruiting efforts at increasing the institutional awareness of these

potential students. This segment choice reflects the types of students considered so well matched to the institution that they are likely to attend. Students in other ability segments are not recruited because of perceived student/institution mismatches and a low probability of attendance.

Importance of Segmentation

While increasing the number of student/institution matches and efficiently allocating scarce recruiting funds are important, the primary value of the market segmentation approach is changing recruitment activities to reflect a new perception of students. The use of segmentation is based on the beliefs that students have measurably different characteristics and behaviors; that these differences are related to the student/institution matching; and that segments of students can be isolated within the overall market (Engel, Fiorillo and Cayley, 1972, pp. 1-2). Prospective students are no longer perceived as all alike or as all unique. Instead, each group of students is considered essentially the same for selected characteristics but is differentiated from other student groups.

Segmentation Strategies

An institution can adopt one of the following strategies toward the student market--undifferentiated, concentrated, or differentiated marketing (Kotler, 1975, pp. 108-110). In undifferentiated marketing, an institution considers the similarities but not the differences among students. The institution tries to appeal equally to all students and offers them a complete range of opportunities. In concentrated marketing, an institution focuses its recruiting efforts on only one of the student segments within the market. Instead of promoting some activity in many different segments, it emphasizes serving a specific part of the market well. In differentiated marketing, the institution selectes two or more student segments and designs

separate recruiting programs for each segment. The strategy actually chosen depends on what resources are available for recruiting, where the competition is strong, and which segments are well matched with the institution.

Approaches to Market Segmentation

Two methods of isolating segments within the student market are the analysis of student characteristics and the analysis of student responses (Engel, Fiorillo and Cayley, 1972, pp. 10-17).

An analysis of characteristics develops student segments by measuring socio-economic, demographic and geographic variables, such as income, social class, sex, and county of residence. An analysis of responses develops student segments by measuring student preferences and behaviors, such as desired college residence, field of study, campus visits, and SAT score reporting. After the segments are developed with either method, these variables are examined to determine the extent to which group differences are related to students' institutional selection. In most cases, using a combination of variables from both methods is necessary to develop meaningful student segments. Ease of measurement, costs, and time expenditures influence the types of variables chosen.

Data Bases Available for Student Market Segmentation Studies

Primary and Secondary Data Bases

In any student segmentation study, data bases containing student characteristics are required. Primary data bases are those that marketers develop specifically for student segmentation analysis. The major advantage of primary data is that the research design and data collection are both controlled by the marketers. Unfortunately, each of these data development stages costs time and money. Secondary data bases are developed

independently by several sources--educational research organizations and commercial organizations--and contain a great deal of information on student characteristics. These secondary data bases cost less since the data already exist, but they also remove control over how and why the data were collected. Because of the trade-off of control over primary data and the low cost of secondary data, student segments are created using one or more available secondary data bases while primary data bases using small samples fill any important gaps that exist in the secondary data.

Four secondary data bases are outlined below. These are followed by a discussion of how and why primary data bases are useful, how combined data bases of all types can be developed, and how segmentation results can be used to manipulate recruiting data bases effectively.

ACE/CIRP Freshman Survey[1]

One important secondary data base is the American Council on Education/ Cooperative Institutional Research Program (ACE/CIRP) Freshman Survey. The ACE/CIRP freshman survey provides a good description of the students presently enrolled in an institution, plus comparative national norms. Students report variables including financial aid, academic ability and preparation, demographics, and personality traits.

Three major drawbacks limit uses of this data base. First, the students sampled have already enrolled in the institution. Segments can describe the types of students that currently attend and are likely to

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[1]American Council on Education/Cooperative Institutional Research Program, UCLA, Los Angeles, Calif.

attend in the future, but generalizations must be made with care and no prospective students can be identified from this source. Second, no geographic information is included in the survey. This prevents the institution from locating regionswhere current students originated in order to target recruitment efforts. Third, any self-reported data may be inaccurate. Students may provide safe or acceptable answers rather than their true attitudes.

SAT Score Reports[2]

The next secondary data base is the SAT score report, obtained from the Admissions Testing Program (ATP), that includes information sent to institutions at the students' request. These reports are available in two data formats: a series of monthly summary tapes and one single end-of-the-year summary tape. Both tapes include Aptitude and Achievement Test results and questionnaire responses. Objective and subjective descriptions focus on high school achievement and activities, demographics, residence preference, and self-ratings of ability. Geographic information--home address, telephone number, and high school location--is available only on the monthly summary tapes. The end-of-the-year summary tape is not available until after the students' senior year of high school. Because both tapes include only those students who have expressed some interest in the institution by reporting SAT scores, generalizations to a wider population should be made with care. Finally, the SAT score report data must be compared with application and enrollment data to determine

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[2]Admissions Testing Program, College Entrance Examination Board, Educational Testing Service, Princeton, New Jersey.

whether students showed any additional interest in the institution. Once segments are defined by a retrospective look at a year's yield, the monthly tapes identify prospects for appropriate recruitment efforts.

Student Search Service[3]

Another secondary data base, the Student Search Service, is available for institutions to obtain names and addresses of students. Included are students who took the Preliminary Scholastic Aptitude Test (PSAT), whose scores are not reported to institutions, and those who did not send Admissions Testing Program (ATP) results to the institution. These data bases are useful because they provide a broad based student population for survey research in support of segmentation studies. These data bases are also useful because they give institutions access to potential students for recruitment activities. In this context, it implies that the institution has already defined the student segments of interest. All students that satisfy the selection criteria and have indicated a willingness to participate in a search are automatically selected. Output to the institution is a list of student names and home addresses at a fixed cost per search plus a cost per student selected.

Selection criteria for the PSAT search include student characteristic variables such as sex, location, test score results and high school performance. The ATP search includes all of the PSAT variables and some additional response variables such as high school activities, residence preference, and educational aspirations. These searches reach students

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[3]Student Search Services, College Entrance Examination Board, Educational Testing Service, Princeton, N.J.

who have not previously expressed an interest in the institution by reporting SAT scores. Institutions participate in these searches because students selected are thought to be likely to apply if they are made aware of the available opportunities. Segments can be defined very broadly (all students in the U.S. scoring over 1,000 on the combined math and verbal sections) or very narrowly (female students in Pennsylvania who scored over 1,000 on the combined test, went to a private high school and are interested in mathematics). The best approach is to select meaningful criteria that result in a reasonable number of names--not so broad that the result is a vast undifferentiated list nor so narrow that the result is overly selective.

There are three limitations of the student search data. First, no additional segmentation analysis is possible since only the mailing labels are provided. Second, the fixed charge per search limits the number of searches an institution can afford, leading to more general search criteria and less precise student segments. Finally, the student sample includes all students taking the PSAT and ATP tests who permit their names to be included in the Student Search Service. While the number of students in the data base is very large, the sample selected through a search may not represent all high school students.

Commercial Data Bases

The final secondary data base concerns commercial data developed through mailing, subscription or directory lists. While these data bases are available for segmentation and recruitment activities, similar to the Student Search Service, they tend to be more expensive and less versatile.

These sources could, however, be very helpful in contacting students who might not be represented in the other secondary data bases. An example comes from some ongoing research concerning college choice and competition that required a list of college freshmen in Pennsylvania. The ACE/CIRP data contained the freshmen at a particular institution; the SAT score reports contained all students who sent scores to an institution; and the Student Search Service contained all students in Pennsylvania who took the PSAT or ATP tests. A comercial mailing list was the only way to get access to all freshman students in Pennsylvania.

Primary and Combined Data Bases

Primary data are developed through survey research, and adds even more information for student segmentation. Missing demographic variables, the student's college choice, and descriptions of all colleges that were considered are examples of new information that can be valuable in segmentation. Improved recruitment techniques and an understanding of the institution's competitive position often result from these sample surveys. This information shows which student segments are presently being served and where competitive strengths exist. It also guides an institution's expansion into new student markets that have previously not been recruited.

Combined data bases eliminate the need for institutions to depend solely on these individual primary or secondary data bases. Institutions can create combinations of available secondary bases, add existing institutional data bases, and develop primary survey research data as well. Combined data bases are created to include information that is not presently being collected, to better understand the nature of the college decision process, and to monitor the institution's image and competition. Development

of these data bases is limited by the incompatible timing of data availability, problems in matching student information from two or more sources, and the computer costs and expertise required to create the final data base.

Statistical Analysis in Student Market Segmentation[4]

Once an appropriate data base has been developed for student segmentation, it is necessary to establish the student segments, assign each individual to a segment, and determine the major differences between segments. The three stages in segmentation analysis are data reduction through the principal components method of factor analysis; formation of student market segments through preselected criteria or cluster analysis; and examination of the major differences among segments through discriminant analysis. A case study of Penn State student segmentation research illustrates some of these techniques.

Data Reduction

Data reduction in student segmentation is needed because of the nature of the data bases used in segmentation studies. The principal components method of factor analysis is often selected as the technique for reducing the data to manageable proportions. Given primary, secondary, or combined data bases, the number of potential variables to analyze in a student

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[4]Sources for statistical analysis are: 1) Nie, N., Hull, C., Jenkins, J., Steinbrenner, L. and Bent, D. Statistical Package For the Social Sciences. Second Edition. New York: McGraw-Hill, Inc., 1975; 2) Cooley, W. and Lohnes, P. Multivariate Data Analysis. New York: John Wiley & Sons, Inc., 1971; 3) Morrison, D. Multivariate Statistical Methods. Second Edition. New York: McGraw-Hill, Inc., 1976.

segmentation study is overwhelming. Some variables measure similar aspects of a general characteristic and should not be used together in an analysis. The principal components method of factor analysis is one way of removing these redundant variables. This technique generates one or more independent axes or components that are each highly related to one or more of the original variables.

These components can be used in the next stage of the analysis to develop segments. An alternative to using components is to select the variable that is most representative of each component for the next stage of the analysis.

Development of Market Segments

Development of market segments is required so that institutional recruitment strategies can focus on student market segments having one or more characteristics or responses of special interest. These qualities can be examined using components representing a group of variables, e.g., socio-economic status or academic ability. An alternative is to use the dominant variable from the component, e.g., father's education or high school grades. One way of developing segments is to select mutually exclusive criteria so that each individual becomes a member of only one segment and all individuals are assigned to a segment.

It is also possible to develop segments using a much larger number of components or variables. Cluster analysis, also known as numerical taxonomy (Sokal and Sneath, 1963), is a method of accomplishing this type of segmentation. Students are clustered into a segment because they are more similar to one another, or closer to one another on a series of components or variables, than they are to other students. This process of clustering continues, joining other students into new segments and

combining existing segments to form larger segments, until all students are members of one general segment. The marketer must decide when to stop the clustering process and how many segments to examine. This decision is subjective, based on the uses planned for the resulting segments.

Identification of Group Differences

Identification of the differences between student segments is the last stage of the segmentation analysis, and discriminant analysis often is the technique chosen. Discriminant analysis takes the student segments and a set of independent variables or components that characterizes them and produces one or more discriminant functions to maximize the separation between the segments and minimize the probability of error in assigning new cases to these segments (King, 1969, pp. 204-211).

The accuracy and usefulness of a discriminant analysis is shown by reclassifying segment members. Regardless of its original segment identification, each segment member is reclassified using the discriminant scores. The actual and reclassified segment memberships are compared, and a percentage of correct classifications is produced. High percentages of correct classifications indicate an accurate and useful means of classifying new cases into the existing segments.

Once the major differences among the student segments have been identified, recruitment techniques and materials can be targeted to the needs and interests of specifid segments. This provides information most relevant to the college decision for students in each segment.

Penn State Segmentation Research

To illustrate segmentation research techniques, a Penn State segmentation study conducted by the Planning Services Division of the Office of Budget

and Planning is presented. The Pennsylvania State University consists of the main campus at University Park that offers all four-year baccalaureate programs; 17 commuter-oriented Commonwealth Campuses throughout the state that offer selected associate programs and the first two years of most baccalaureate programs; and Behrend College, a small liberal arts school, offering selected associate and baccalaureate programs and two years of most other baccalaureate programs. Each year, one third of the incoming freshman students enroll at the main campus at University Park, with the remaining two thirds at the Commonwealth Campuses and Behrend College. For the purposes of this study, Behrend College is included within the Commonwealth Campus designation.

Using data from the Freshman Survey, two hypotheses were tested: (1) that entering baccalaureate freshmen at the Commonwealth Campuses are different from those entering the main campus at University Park; and (2) that differences exist among the students entering different Commonwealth Campuses. From the 200 variables in the data base, 75 were deemed important in recruitment activities and were selected for analysis.

Two segments were created from a location criterion--University Park and Commonwealth Campus students--to test the first hypothesis. The 75 variables were reduced through a principal components analysis to 26 independent components, and the variable most closely related to each component was selected for use in the discriminant analysis. When two variables reflecting artifacts of the Penn State admissions process were removed, the single discriminant function showed a significant difference

between the two groups based on only four variables. Reclassification of these students was quite good with 78 percent of the students classified correctly.

The major differences between the two groups were that University Park students received more parental aid, rated themselves higher in academic ability, attached greater importance to living away from home, and had fathers with a higher level of education.

These segment differences served as a guide to the types of students likely to attend University Park and the Commonwealth Campuses. Special information developed for each segment should create better student/institution matches.

The same variables were used in an analysis of segments representing each of the individual Commonwealth Campuses. Results from the discriminant analysis revealed 11 significant functions. However, the classification was not very successful since only 29 percent of the students were correctly reclassified using the discriminant scores. We concluded that it was possible but not practical to develop recruitment activities focusing on unique student segments for each of the Commonwealth Campuses.

Summary

Student market segmentation occupies an intermediate role in the total recruiting process: it translates institutional objectives into suggestions for possible recruiting activities. The primary short term benefits are a more efficient allocation of resources, an increase in student/institution matches, and a change in institutional perception of recruiting prospective students. This snapshot view of the student market is important to the immediate aim of enrolling a qualified freshman class each year. Segmentation should produce better results than a general appeal to all students.

The long term benefits of an on-going student market segmentation process may have more value. Trends in the student market segments, recruitment strategies, and enrollment rates can be observed over time. The long range plans of the institution should evaluate this information to determine what students to recruit, how many students to enroll, and changes in student market share and in total numbers to anticipate in each segment.

As the number of high school graduates declines over the next decade, this historical perspective of student market trends will allow institutions to monitor declines in specific student segments. Decisions about program changes to adjust to a changing student environment can be based on a rational evaluation of patterns observed for all student segments.

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